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**MOBILE TELEPHONE WITH AN AUDIO UNIT**  
[Mobiltelefon mit Audioeinheit]

Sabine Hofschen et al

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Inventor : Sabine Hofschén, Ludwig Hofmann,  
Wolfgang Thulke, and Harald  
Schindele

Applicant : Siemens Inc., Munich, Federal  
Republic of Germany

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## Mobile Telephone with an Audio Unit

The invention concerns a mobile telephone with an HF transmitter and receiver part, with a modulator/demodulator at least for voice signals, an NF part, a control unit, an input field, and a power supply unit including a battery.

Mobile telephones have been gaining ever more importance in daily life and are carried at all times by many people. On the other hand, also portable music reproduction apparatus on the basis of analog or digital magnetic cassette tape players or on the basis of optically scannable discs ("CD", "mini disc") enjoy great popularity, while usually headphones with two earphones are used to listen to stereophonic recordings.

It is desired to carry and selectively use both devices, but the alternate handling of both devices is difficult, so that despite the compact construction provided by modern technology there are problems related to the size and weight of both devices.

It is an object of the invention to eliminate or reduce the mentioned problems.

This object is attained based on a mobile telephone of the kind described initially in that the mobile telephone is at least

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<sup>1</sup> Numbers in the margin indicate pagination in the foreign text.

temporarily joined as one device with an audio unit, which is set up at least to reproduce, occasionally also to record, audio signals from a storage medium or on a storage medium, and an electric connection between the mobile telephone and the audio unit can be produced at least with regards to specific functions.

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The invention offers first the advantage that only one single device must be transported instead of two devices as until now, namely a mobile telephone and portable CD player, tape player, etc., and the joining of the different functions can result in many advantages for the user.

Other advantages also result, however, which are based on the in part unexpected synergy effects.

It is also practical that the mobile telephone and the audio unit have a common housing. In this way results a considerable savings of volume and weight, so that a mobile telephone according to the invention is only slightly larger or heavier than a conventional device. During music listening, an incoming call can be handled without problem, since the headphones used for this purpose are also used for telephoning. Also a better clarity results, which is based on the usually better acoustic (dynamic, sound attenuation) of the headphones.

Another increase of the compactness can be achieved if the control unit, as well as the input field for the control, is also included in the audio unit.

If a storage medium is used, which also allows a recording, another possibility is offered of recording telephone conversations if needed.

The invention is not limited to specific technical standards; it can be used, for example, in all the currently known mobile or wireless telephone systems such as, for example, GSM, PCN, PCS, CDMA, DECT, and PHS, and there is also no limitation to specific audio systems or storage media.

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It has been shown to be advantageous if the storage medium is a compact disc or a mini disc or a magnetic cassette tape, whereas digital reproduction or recording systems with reduced measurements bring special advantages.

Great savings in weight and volume result if the audio unit is supplied by the power supply unit or the control unit is set up for monitoring the battery capacity and, when the same falls below a predetermined capacity, the audio unit is separated from the power supply so as to still be able to telephone in case of need or in an emergency.

To increase the comfort for the user and for the purpose of a further reduction of space and energy demand, it can be recommended, if the NF part is also allocated to the audio unit, so that the control unit is set up for switching over an input of the NF part to the modulator/demodulator and/or the audio unit. Therefore, it is recommended to direct the control unit to switch off the audio unit from the NF part or to its mute switch during incoming or outgoing calls.

The use is simplified in case in case a headphone as well as a microphone can be connected to the NF part, so that the headphone and microphone are joined to one set and another practical advantage results in that the microphone is attached by means of a foldable or extractable extension piece to an earphone capsule. On the other hand, another variation that can be very light and use very little space can be characterized in that the microphone is arranged on a mechanical connection point of the lines that lead from two earphone capsules.

To facilitate the operation it can be provided to arrange at the set a switch connected to the control unit

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for a manual switchover of the telephone operation to reproduction operation from the audio unit, and that a volume control is arranged on the set.

A documentation of important telephone calls is made possible in case the audio unit is set up for recording telephone conversations after a corresponding activation by means of the input field and the control unit.

Since the mobile telephone of the invention is not necessarily placed by the ear during operation like the usual "cell phones," but can be hung, clipped, or carried in a handbag, it is recommended that the antenna be arranged, for example, as a flat antenna in or on the device. This leads also to the fact that the HF radiation no longer takes place in the possibly particularly sensitive area of the head of the user.

So as to be able to carry the device always protected in its location, for example, in a handbag, backpack, etc., a remote control, which can be wirelessly connected, is provided to activate the control unit.

An unintentional actuation of switches or keys on the dialing field can be prevented, if needed, if a keypad lock is assigned to the dialing field.

For further increasing the user friendliness, the control unit can have a voice recognition part by means of which the device functions can be controlled via the microphone. In this case, the telephone keypad can be completely omitted.

An often desirable variation is characterized in that the audio unit is set up, aside from for reproducing/recording of/on a

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storage medium, also for receiving and reproducing radio broadcasts.

The invention together with further advantages is explained in more detail below with reference to the exemplary embodiments, which are shown in the drawings, and wherein

Fig. 1 shows a block circuit diagram of a mobile telephone according to the invention,

Fig. 2 shows a perspective view of a possible embodiment of a radiotelephone according to the invention,

Figs. 3 and 4 each show a lateral view of a part of the headphone set with the microphone folded open and closed, and

Fig. 5 shows in a frontal view another embodiment of the microphone in a set.

The invention is explained first in Fig. 1 based on a block circuit diagram. The mobile telephone has a high frequency transmitter part HFS and a high frequency receiver part HFE with a common antenna ANT. The control of the high frequency receiver and transmitter parts takes place in general by way of a synthesizer SYN, which in turn is supplied by a reference signal source REF. Between a low frequency part NFT and the

high frequency receiver and transmitter part is provided a modulator MOD and a demodulator DEM, in general a encoder/decoder.

An audio unit AUD is also present, which is connected to the low frequency part NFT. An essential part of the mobile telephone is a control unit STE, which is allocated to an input unit EIN and a display unit ANZ. Even though in Fig. 1 the control unit STE is shown symbolically as a closed unit, it should be clear that the logical functions of the control unit can be separated

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(decentralized), while its subunits can utilize a common CPU.

If these (or the entire control unit) are located in the audio unit or in the telephone part is unimportant.

The audio unit AUD comprises a storage medium SPM, for example, a conventional compact disc, but can also be a storage medium suitable for recordings, for example, a DAT cassette. The input field serves in the invention not only for inputting the data on the actual mobile telephone, for example, telephone numbers, but also for inputting information on the audio part, for example, commands with regard to title information or title sequence. In the case of a storage medium that can also carry out recordings, also the command for reproduction or recording, for example, can take place.

The control unit STE links here also the functions of the actual mobile telephone to the audio unit, so that, for example, in an incoming or outgoing call, by means of the control unit, either the audio unit is stopped or the volume level is reduced on the side of the audio unit or it is brought to zero. At the same time, as shown in the exemplary embodiment, the low frequency part NFT can be used for an incoming and outgoing telephone signal as well as also for incoming or to be recorded audio signals. Instead of the usual "ringing" of the telephone, the incoming calls can also be signalized by a "knocking," in case the user is at that time listening, for example, to a cassette or the radio.

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To the output of the low frequency part NFT is generally connected a set GAR, which consists of two earphone capsules OHK and a microphone MIC. With this respect will be provided more explanations further below. In a usual mobile telephone is also constantly monitored in the invention the capacity of the battery BAT. To prevent a complete consumption of the battery capacity by the audio unit AUD, the control unit is set up, not only for monitoring the battery capacity, but also for separating the audio unit from the power supply SPA, in case a predetermined minimum capacity of the battery BAT falls short.

As already mentioned, the control unit can weaken or set to zero the output signal of the audio unit AUD during incoming or outgoing calls. On the other hand, also a complete switchover of the input of the NF part NFT from the audio unit to the demodulator DEM is possible.

For a manual switchover between telephone operation and reproduction operation from the audio unit can be mounted a manually operable switch SCH, which is suitably arranged on the set GAR. In principle, it is however also possible to input all the functions that can be controlled by means of the control unit STE, not only by means of the input unit EIN, but also by means of a remote control FEB, which is wireless, for example, it is connected over an infrared distance in a known manner to the control unit STE.

With reference to the control of the functions of the device, it is also to be noted that a voice recognition unit SPE can be provided, which receives voice signals from the low frequency part NFT and which, together with the control unit STE, is arranged so that specific device functions can be controlled phonetically by the user of the mobile telephone from the microphone MIC. In such a case, it is even possible to eliminate for the most part a keypad, for example, the usual telephone keypad could be eliminated.

A mobile telephone of the invention can preferably be carried in a pocket of the clothing, in a handbag, or also a backpack, while a connection to the user is provided by means of a wire and the set GAR with the microphone MIC and earphone capsules OHK, if required also by means of the remote control FEB. To prevent an unintentional actuation, for example, of the keys of the mobile telephone, a keypad lock TSP is suitably allocated to the input unit EIN. The input field, in particular the keypad, can also be protected, for example, under a flap, and only the reception key of the telephone together, for example, with the "PLAY" key of the cassette recorder arranged beside it are freely accessible.

It should be emphasized that the block circuit diagram of Fig. 1 represents only roughly one of the many possible embodiment variations. Practical embodiments are possible, which only require a single printed circuit for the structure. Depending on the degree of integration can then be used in unison several or less components like in Fig. 1, for example, a low frequency part. In general, separate high frequency parts will be required for radio and telephone; in solutions with multiple system telephone, such as dual telephones, which can work according to the GSM as well as also according to the DECT

standard, also separate frequency parts will be required for each standard.

In Fig. 2 is shown a possible physical configuration of a mobile telephone of the invention. Herein, the housing shape is adapted mainly to the size of a compact disc, so that, on the other hand, the input field EIN is located on this side. This field has, for example, numeric or alphanumeric keys, which do not only serve for controlling the function of the actual mobile telephone, but also for inputting specific data on the playback device, for example, the title, search function, etc. In the front of the device can be seen the display unit ANZ, which displays the functions of the telephone,

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namely, for example, a selected number, a number of a subscriber to be called, a title number of the storage medium, or also a title name from the storage medium. Practical switches and controls for the mobile telephone can be mounted, for example, on the periphery of the housing, while here the volume control is designated with LSR. The volume control LSR can, however, be advantageously also mounted on an earpiece set GAR, which is described further below, for example, on their supply line cable, and is therefore easily accessible to the user.

An earpiece is usually not used in a conventional mobile telephone, but the device as such is guided toward the ear like a common telephone receiver with the earpiece capsule and the microphone in the area of the mouth. In the mobile telephone according to the invention, however, as a rule, an already mentioned set GAR is used, which usually (due to the stereo reproduction) has two earphone capsules and furthermore also a microphone MIC. In Figs. 3 and 4 is shown such a set GAR in a partial illustration with an earphone capsule OHK and a miniature microphone MIC, which is arranged at the end of a foldable extension piece VER. The extension piece VER can be pivoted around the axis of the earphone capsule OHK in the manner shown, namely, from a rest position according to Fig. 3, in which the extension piece together with the microphone is folded up in the vicinity of a support bracket TRA, in an operation position, which is shown in Fig. 4, wherein the extension piece VER with the microphone is folded down, so that the user can speak into it.

An alternative embodiment is shown in Fig. 5. According to this embodiment, the microphone MIC is arranged on the mechanical connection point between the two lines leading to the earphone capsules OHK and the line leading to the device arranged in the center, so that the microphone, when the set is carried, will be

usually in the area of the neck or below the neck of the user and the user will be able to effectively speak into it.

If it is desired, a loudspeaker and/or microphone can also be provided on the device, so that also the possibility of a hands-free use is provided.

The invention is not limited to the shown exemplary embodiment, but can be modified in many ways. This concerns in particular the selection of storage mediums, which can be an optically scannable storage medium such as a compact disc. It can also be a storage medium of another kind, for example, a common audio tape cassette, or also a digital DAT cassette. Such a cassette can be used, just like, for example, a so-called "mini disc," for recording audio signals, in particular telephone conversations. The storage medium can also be a digital storage memory chip or it can be such a memory chip in addition to, for example, a storage medium configured as a compact disc and serves as a memory for an answering machine. An audio unit can also be set up for receiving and reproducing radio transmissions, so that the corresponding receiver unit, which is not shown in detail herein, can be actuated also by the input unit by means of the control unit.

The described exemplary embodiment shows a relatively far-reaching integration of the elements "mobile telephone" and

"audio unit." On the other hand, such a far-reaching integration may not be necessary. It is, for example, conceivable to install a mobile telephone and an audio unit as autarchic devices, but to connect them mechanically and also electrically with regard to the functions that were described in detail above so as to form one device, if needed. For this purpose is merely needed a mechanical latching and a suitable plug connection with a corresponding number of contacts. If required, a suitable mutual shielding must be ensured for the separate hardware of both devices.

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#### Patent Claims

1. A mobile telephone having an HF transmitter and receiver part (HFS, HFE), a modulator/demodulator (MOD/DEM) for at least voice signals, an NF part (NFT), a control unit (STE), an input field (EIN), and a power supply unit (SPA) with a battery (BAT),  
wherein  
an audio unit (AUD) is temporarily joined to the mobile telephone to form a single unit, which is set up for reproducing, if required also for recording, audio signals by a storage medium or on a storage medium, and wherein an electric connection can be established between the mobile

telephone and the audio unit at least with regard to specific functions.

2. The mobile telephone of claim 1, wherein the mobile telephone and the audio unit (AUD) have a common housing.
3. The mobile telephone of claim 1 or 2, wherein the control unit (STE) as well as the input field (EIN) are also used for controlling the audio unit (AUD).
4. The mobile telephone of one of the claims 1 to 3, wherein the storage medium (SPM) is a compact disc or mini disc or a magnetic cassette tape.
5. The mobile telephone of one of the claims 1 to 4, wherein the audio unit (AUD) is supplied by the power supply unit (SPA).
6. The mobile telephone of claim 5, wherein the power supply unit (SPA) or the control unit (STE) are set up for monitoring the battery capacity

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and, when said capacity falls short of a predetermined capacity, the audio unit (AUD) is separated from the power supply.

7. The mobile telephone of one of the claims 1 to 6, wherein to the NF part (NFT) is also allocated the audio unit (AUD), so that the control unit (STE) is set up for switching over an

input of the NF part to the modulator/demodulator (MOD/DEM) and/or the audio unit (AUD).

8. The mobile telephone of claim 7, wherein the control unit (STE) is set up for switching over the audio unit (AUD) from the NF part (NFT) or mutes the same during an incoming or outgoing call.
  9. The mobile telephone of claim 7 or 8, wherein headphones (OHK) as well as a microphone (MIC) can be connected to the NF part (NFT), so that the headphones and the microphone can be joined for forming a set (GAR).
  10. The mobile telephone of claim 9, wherein the microphone (MIC) is attached with a foldable or extractable extension piece (VER) to the earphone capsule (OHK).
  11. The mobile telephone of claim 9, wherein the microphone (MIC) is arranged on a mechanical connection point of the lines leading away from the two earphone capsules (OHK).
  12. The mobile telephone of one of the claims 9 to 11, wherein a switch (SCH) connected to the control unit (STE) is arranged on the set (GAR) for a manual switchover from the telephone operation to the reproduction operation of the audio unit.
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13. The mobile telephone of one of the claims 9 to 12, wherein a volume control (LSR) is arranged on the set (GAR).

14. The mobile telephone of one of the claims 1 to 13, wherein the audio unit (AUD) can be set up for recording telephone conversations after a corresponding activation via the input field (EIN) and the control unit (STE).
15. The mobile telephone of one of the claims 1 to 14, wherein the antenna is arranged, for example, as a flat antenna in or on the device.
16. The mobile telephone of one of the claims 1 to 15, wherein a remote control (FEB) that can be wirelessly connected to the control unit (STE) is provided to activate said control unit.
17. The mobile telephone of one of the claims 1 to 16, wherein a keypad lock (TSP) is allocated to the input field (EIN).
18. The mobile telephone of one of the claims 1 to 17, wherein the control unit (STE) has a voice recognition part (SPE), via which device functions can be controlled from the microphone (MIC).
19. The mobile phone of one of the claims 1 to 18, wherein the audio unit (AUD), aside from the reproduction/recording from/on a storage medium, is also set up for the reception and reproduction of radio broadcasts.

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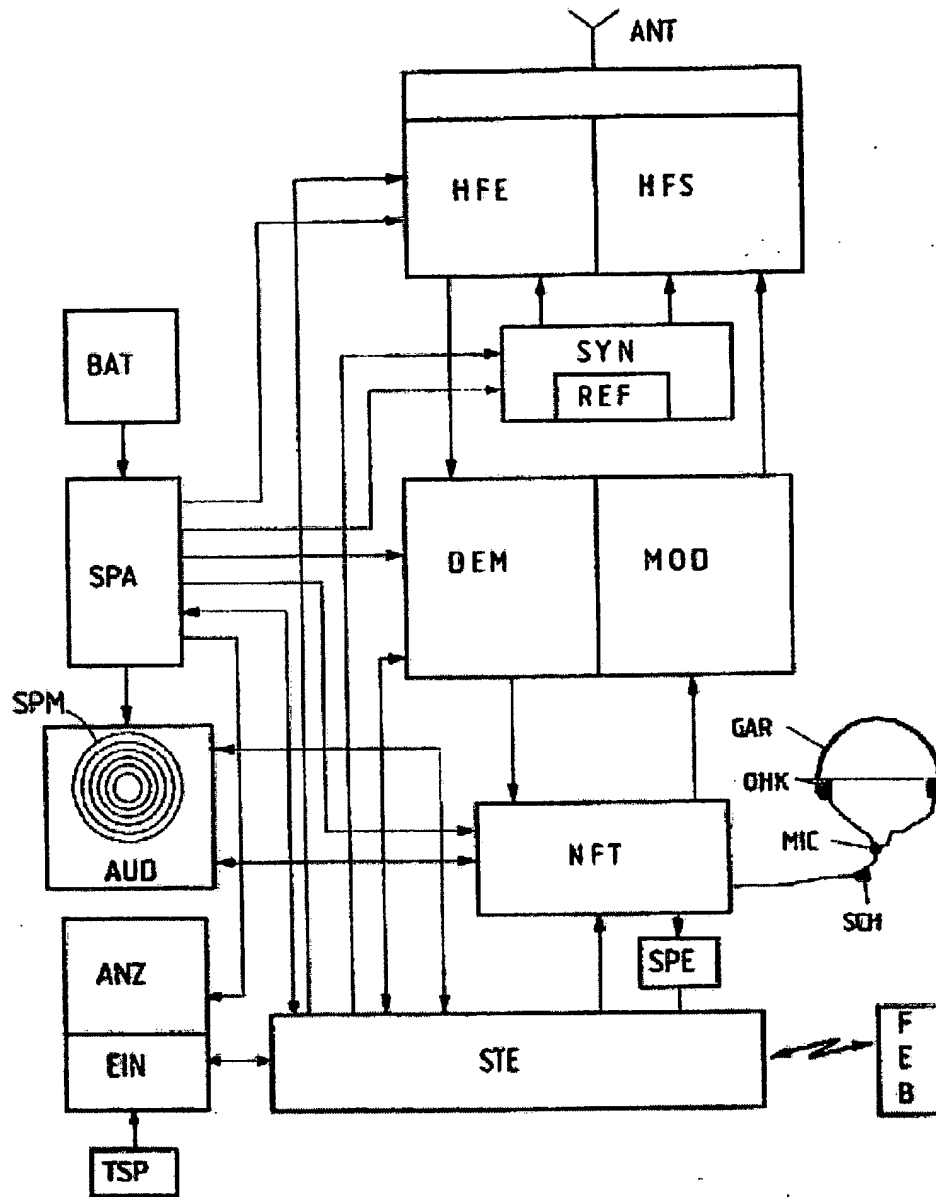


Fig.1

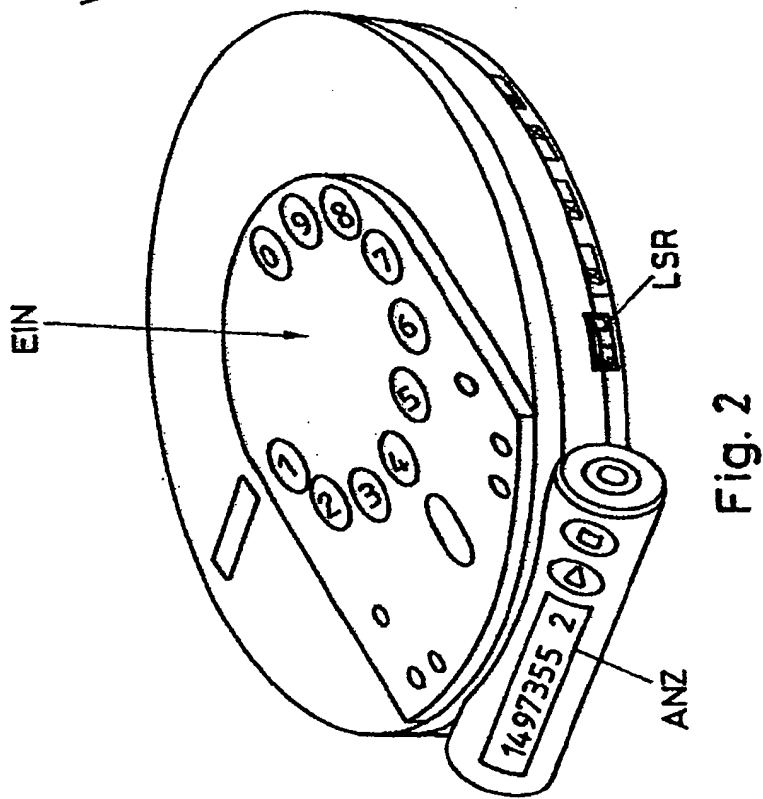


Fig. 2

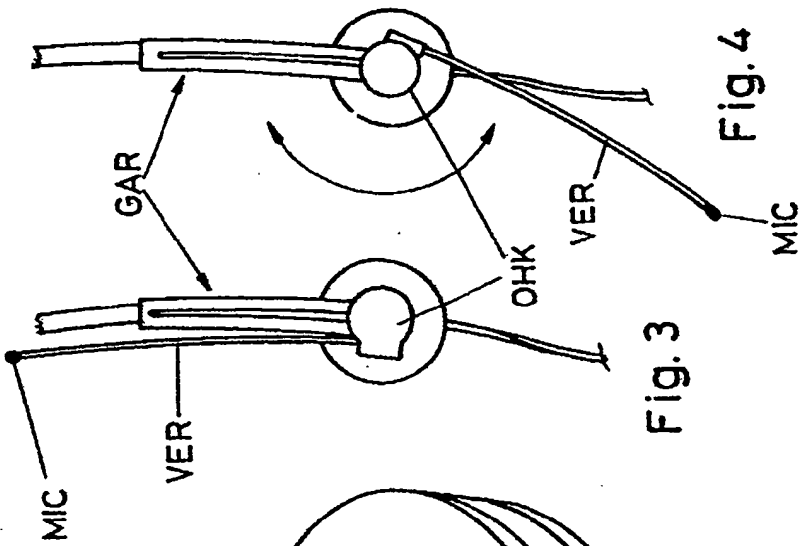


Fig. 3

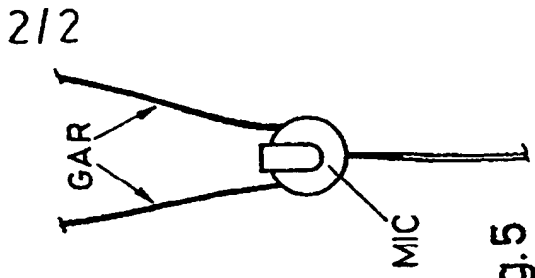


Fig. 4

Fig. 5